Brand awareness in business markets: When is it related to firm performance?

Christian Homburg [*], Martin Klarmann [1], Jens Schmitt [2]

University of Mannheim, Institute for Market-Oriented Management, 68131 Mannheim, Germany

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ABSTRACT

In Business-to-Business (B2B) environments, many firms focus their branding activities on the dissemination of their brand name and logo without developing a more comprehensive brand identity. Thus, the creation of brand awareness is an important goal in many B2B branding strategies. However, it is still unclear if the great investment necessary to build a high level of brand awareness really pays off in business markets. Therefore, drawing on information economics theory, this paper investigates under which conditions brand awareness is associated with market performance in a B2B context. Results from a cross-industry study of more than 300 B2B firms show that brand awareness significantly drives market performance. This link is moderated by market characteristics (product homogeneity and technological turbulence) and typical characteristics of organizational buyers (buying center heterogeneity and time pressure in the buying process).

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1. Introduction

For most companies in Business-to-Consumer (B2C) environments, developing and maintaining strong brands is a key element of their marketing strategy (Aaker, 2002; Keller & Lehmann, 2006). In comparison, companies targeting business customers often put less strategic emphasis on branding (Bendixen, Bukasa, & Abratt, 2004). Consequently, according to the most recent brand ranking conducted by *Business Week* and Interbrand, only 17 Business-to-Business (B2B) brands are listed among the 100 most valuable brands worldwide (Business Week, 2009). This low number is particularly surprising given the much larger economic importance of B2B relative to B2C transactions (Hutt & Speh, 2006).

Marketing managers in B2B markets therefore face an important question: Have they unjustly neglected branding as a marketing instrument, or do B2B market characteristics prevent brands from being effective? These managers receive little guidance from marketing academia because previous research has mainly focused on B2C brands (e.g., Bendixen et al., 2004). However, considerable differences between organizational buyers and consumers prevent an easy application of findings from this research stream to a B2B context. In particular, compared to consumers, organizational buyers are characterized as being exposed to different risks with a personal and an organizational dimension (Mitchell, 1995), as processing information more intensively (Johnston & Lewin, 1996) and as putting

greater emphasis on establishing long-term supplier relationships (Webster & Keller, 2004), leading to more rational buying decisions (Bunn, 1993; Wilson, 2000).

In an environment of this kind, it may be that brands function differently than they do in B2C markets. In particular, the role of brands in reducing the perceived risk of a purchase is likely to be stronger because buyers face two types of risk: organizational risk and personal risk (Hawes & Barnhouse, 1987). At the same time, the brands in question are much less likely to provide emotional benefits for the buyers (Wilson, 2000). Furthermore, a number of earlier studies have highlighted that B2B brands function not only as entities but also as processes (Stern, 2006; Ballantyne & Aitken, 2007), making relational dimensions of branding such as customer trust and brand reputation key determinants of brand equity (Cretu & Brodie, 2007; Glynn, Motion, & Brodie, 2007; Roberts & Merrilees, 2007).

It is likely that brand awareness also plays a special role in driving brand equity in business markets (Davis, Golicic, & Marquardt, 2008). In particular, many B2B firms focus their branding activities merely on the dissemination of the brand name and the logo without developing a more comprehensive brand identity (Court, Freeling, Leiter, & Parsons, 1997; Kotler & Pfoertsch, 2006). Thus, for many B2B firms, the creation of brand awareness – i.e. the ability to recognize or recall a brand – is a key element of branding strategy (Munoz & Kumar, 2004; Celi & Eagle, 2008). For instance, the head of marketing of a large chemical firm remarked to us in a qualitative pre-study, "To us, branding is basically to put our name and logo on all products we ship to our customers. We want our customers to think of this name, whenever they consider buying products in our category."

However, little is known about whether investments in brand awareness actually pay off for B2B firms. This is our point of departure. We analyze the link between brand awareness and market performance across a number of B2B industries. Based on the theory of

* Corresponding author. Tel.: +49 621 181 1555; fax: +49 621 181 1556.
 E-mail addresses: homburg@bwl.uni-mannheim.de (C. Homburg),
martin.klarmann@bwl.uni-mannheim.de (M. Klarmann),
jschmitt@bwl.uni-mannheim.de (J. Schmitt).
 [1] Tel.: +49 621 181 3498; fax: +49 621 181 1556.
 [2] Tel.: +49 621 181 1545; fax: +49 621 181 1556.

information economics, we expect brand awareness to be related to market performance through the reduction of perceived risk and information costs for buyers (Erdem, Swait, & Valenzuela, 2006).

It is important to note that some earlier studies have already addressed the brand awareness–market performance link in single B2B industries such as logistics (Davis et al., 2008), market research (Wuyts, Verhoef, & Prins 2009), personal computers (Hutton, 1997), and semiconductors (Yoon & Kijewski, 1995). However, organizational buying behavior strongly depends on diverse situational characteristics (Johnston & Lewin, 1996; Lewin & Donthu, 2005), and this approach neglects that the effect of brand awareness on performance could be contingent on the characteristics of the specific market. For instance, previous studies of brand awareness in business markets have largely focused on industries that are technologically turbulent. In such industries, brands are likely to play a more important role because buyer information search processes are shorter (Weiss and Heide 1993).

As a consequence, rather than asking *whether* brand awareness and performance are related, we ask *when* (i.e., *under what conditions*) brand awareness is associated with market performance in a B2B context. In this context, the theory of information economics points to two important types of moderators: characteristics of typical buyers and characteristics of the market (Akerlof, 1970; Stiglitz, 2000). Thus, we focus on analyzing the moderating effects of three characteristics of typical organizational buyers (buying center size, buying center heterogeneity, and time pressure in the buying process) and two market characteristics (product homogeneity and technological turbulence) on the link between brand awareness and market performance.

We test these moderating effects empirically using structural equation modeling with latent interactions. For this analysis, we rely on data from a survey of marketing and sales executives that were validated using objective performance information as well as publicly available brand awareness information. Our cross-firm, cross-industry sample includes more than 300 B2B firms with a broad range of products. In particular, we find strong empirical support for the moderating effects of buying center heterogeneity, time pressure in the buying process, product homogeneity, and technological turbulence.

2. Conceptual framework

2.1. Overview

The conceptual framework of our study is basically a chain of effects leading from brand awareness via market performance to firm financial performance. In addition, we include market and buyer

characteristics that may possibly influence the relationship between brand awareness and market performance. The unit of analysis is a strategic business unit (SBU) within a firm (or the entire firm if no specialization into different business units exist) and its most important brand. We understand the brand as a "name, term, sign, symbol, or design, or a combination of them, [that] is intended to identify the goods and services of one seller or a group of sellers and to differentiate them from those of competitors" (Kotler, 1997, p. 443). Consequently, a supplier offers a branded product to its organizational buyers once the product is not anonymously marketed but is associated with a specific identification mark. Fig. 1 presents an overview of our framework and the specific constructs.

Brand awareness is the focal independent variable in our study. It is a key branding dimension (e.g., Aaker, 1996) and has been shown to have an impact on brand choice, even in the absence of other brand associations (e.g., Hoyer & Brown, 1990). Applying Keller's (1993) well established definition of brand awareness to a B2B context, we define *brand awareness* as the ability of the decision-makers in organizational buying centers to recognize or recall a brand.

In previous research, increases in sales have been identified as a key aim of branding activities (Chaudhuri & Holbrook, 2001). Therefore, we consider market performance as a key consequence of brand awareness in our framework. We define *market performance* as firm performance in terms of the development of the quantity of products or services sold, which in turn is captured by customer loyalty, the acquisition of new customers, the achievement of the aspired market share, and the achievement of the aspired growth rate (Homburg & Pflesser, 2000). As recommended in a number of recent studies in the marketing literature (Lehmann, 2004; Mizik & Jacobson, 2003; Rust, Ambler, Carpenter, Kumar, & Srivastava, 2004), our framework also incorporates *financial performance*, defined as the return on sales of the SBU in the marketplace relative to that of its competitors.

Our paper focuses on analyzing moderators of the brand awareness–performance link. We therefore do not put forward a hypothesis regarding this relationship itself. Instead, we outline the basic logic linking these constructs in the following section before introducing possible moderators in Section 2.3.

2.2. Link between brand awareness and market performance

In this section, we address the question of why brand awareness may have an impact on the market performance of firms in a B2B context. We draw extensively on the theory of information economics (Spence, 1974; Erdem, Swait, & Louviere, 2002; Stump & Heide, 1996). The basic proposition of this theory is that markets are characterized by imperfect and asymmetrical information. Thus, customers are
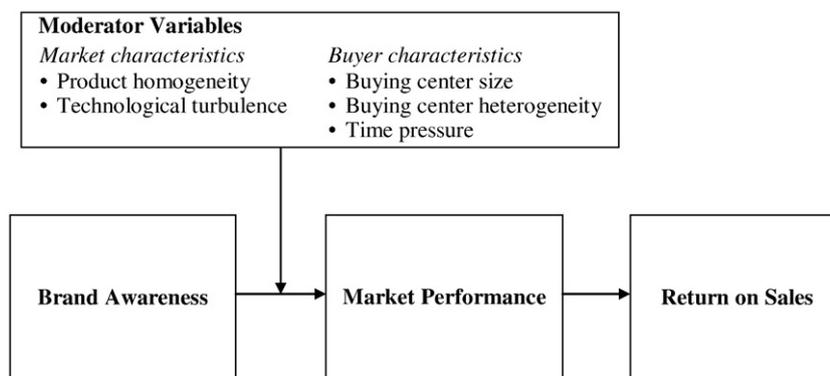

Fig. 1. Framework and constructs.

uncertain about product quality and therefore perceive their decisions as risky because the consequences of a purchase cannot be entirely anticipated. Based on this theory, our key rationale is that brand awareness drives market performance through two mechanisms: it reduces buyer information costs and buyer-perceived risk (Erdem & Swait, 1998).

The first mechanism refers to the reduction of information costs for the buying firm. In particular, to reduce the resource requirements associated with collecting the information necessary for a purchase decision, buyers may resort to extrinsic cues (Richardson, Dick, & Jain, 1994; Van Osselaer & Alba, 2000). This is especially true for multi-person decision-making (Hinsz, Tindale, & Vollrath, 1997) — for example, in purchase decisions made by buying centers (Barclay & Bunn, 2006; Johnston & Lewin, 1996).

In this context, brand awareness may function as an important cue regarding a number of product and supplier characteristics. More specifically, brand awareness acts as a strong signal of product quality and supplier commitment (Hoyer & Brown, 1990; Laroche, Kim, & Zhou, 1996; MacDonald & Sharp, 2000) because high levels of supplier investment (e.g., in exhibitions, advertising, or packaging) are usually necessary to build high brand awareness. Thus, the supplier currently spends money expecting to recover it in the future (Kirmani & Rao, 2000), which is only likely to occur if the products are of a certain level of quality. Consequently, only high-quality firms can afford high-level investments in brand awareness (Erdem et al., 2006; Milgrom & Roberts, 1986). Furthermore, brand awareness may signal presence and substance because high awareness levels imply to the buyer that the firm has been in business for a long time, that the firm's products are widely distributed, and that the products associated with the brand are purchased by many other buyers (Aaker, 1991; Hoyer & Brown, 1990). Because firms tend to "satisfice" (Simon, 1976) instead of aiming for optimal solutions, this information is likely to strongly reduce a firm's incentive to collect information on low awareness brands.

The second mechanism refers to the reduction of perceived risk. More specifically, brand awareness reduces both the personal risk of the decision-makers in the buying center and the organizational risk for the buying firm itself (Mitchell, 1995; Hawes & Barnhouse, 1987). The personal risk may relate to job security, career advancement, or status and appreciation within the company (Anderson & Chambers, 1985; McQuiston & Dickson, 1991). The role of brand awareness in reducing the personal risk for members of a buying center is well described in the popular saying that "nobody ever got fired for buying IBM." It is likely that decision-makers prefer to buy a brand associated with high awareness levels because it reduces the risk of their being blamed if the decision turns out to have been a mistake. Additionally, high-level brand awareness may also reduce perceived organizational risk (Dawar & Parker, 1994; Mitchell, 1995). In particular, organizations may well assume that the brands they know well are likely to be purchased by many other firms (Aaker, 1991). Therefore, they have reason to expect that the purchase of a well-known brand will not result in any competitive disadvantage. At the same time, as described above, brand awareness signals a high-product quality (Dawar & Parker, 1994; Rao & Monroe, 1989). Thus, purchasing high awareness brands is also associated with reduced functional risk for the organization, which further influences brand choice.

2.3. Moderators of the link between brand awareness and market performance

In the last section, we have described the general logic linking brand awareness to the performance of a brand in the market. However, given the diversity of B2B markets, it is the key goal of our study to analyze the conditions under which this link is particularly pronounced. We therefore include a number of moderating variables in our framework.

Our choice of moderators is again guided by information economics. It points to two factors that influence a buyer's need to reduce information costs and perceived risk: the market and the organizational buyer (Akerlof, 1970; Stiglitz, 2000). Depending on the characteristics of a market, buyers may have different uncertainty levels, information requirements, and information acquisition costs (Nelson, 1970). Two key characteristics determining these uncertainty and information aspects in a market are product homogeneity and technological turbulence (Achrol & Stern, 1988). In organizational buying literature, these two characteristics have been shown to influence the information and risk behavior of organizational buyers (Spekman & Stern, 1979; Tushman & Nelson, 1990; Weiss & Heide, 1993). For instance, the duration of the overall information search process is shorter in turbulent markets than in stable ones (Weiss & Heide, 1993).

The characteristics of an organizational buyer may also be related to information requirements and information costs. These are mainly determined by the available sources of information, the buyer's capacity, and the time frame in which the information search has to take place (Bunn, Butaney, & Hoffman 2001). As a consequence, buying center size, buying center heterogeneity, and time pressure can be identified as important buyer characteristics for our study. They have also been shown to influence the information and risk behavior of organizational buyers (Dawes & Lee, 1996; Johnston & Lewin, 1996; Kohli 1989).

Therefore, we address two sets of moderator variables that we expect to impact the awareness–performance link: characteristics of the market (product homogeneity and technological turbulence) and characteristics of typical organizational buyers (buying center size, buying center heterogeneity, and time pressure in the buying process). In the following, we define each of these characteristics.

In the category of *market characteristics*, we include *product homogeneity*, defined as the degree of technological or benefit-related similarity between the products in a particular market (Weiss & Heide, 1993), and *technological turbulence*, defined as the rate of technological change in an industry (Jaworski & Kohli, 1993). Under the heading of *characteristics of typical buyers*, we study possible moderating effects of buying center size, buying center heterogeneity, and time pressure. *Buying center size* refers to the number of individuals involved in a typical customer's buying decision (Kohli, 1989). *Buying center heterogeneity* refers to the variety of individuals in the buying center with respect to prior knowledge, functional background, and objectives. Finally, *time pressure* refers to the extent to which buying center members feel pressured to make decisions quickly (Kohli, 1989).

3. Hypotheses development

3.1. Moderating effects of market characteristics

In the following sections we develop hypotheses regarding the effect of possible moderators on the link between brand awareness and market performance. In this section, we focus on the moderating effects of market characteristics: product homogeneity and technological turbulence.

3.1.1. Product homogeneity

In markets with high levels of product homogeneity, the buying organization will encounter great difficulty in distinguishing product offerings and their quality. Thus, information costs may be high because an extensive information search and in-depth analysis will be necessary to detect some of the possible quality differences among products. However, it may not be worthwhile for the buyer to bear such high information costs because the possible differences will probably not be significant. In such a situation, where the application of economic or objective decision criteria is problematic, buyers may

resort to extrinsic cues, and brand awareness is more likely to be the decisive factor in the purchase decision (Warlop, Ratneshwar, & Van Osselaer, 2005).

This reasoning finds support in the consumer behavior context, where for simple choice tasks, consumers have been shown to use simple heuristics based on awareness, such as "buy the best known brand" (Hoyer & Brown, 1990). Findings from research in organizational buying behavior also support the expectation of a positive moderating effect of product homogeneity. Weiss and Heide (1993) show that the overall duration of the search process is longer when the homogeneity of the products in a market is low. In such a case, buyers rely more heavily on the large amount of diverse and possibly more objective information gathered in extensive information searches. Thus, in the case of low product homogeneity, the impact of brand awareness on buying decisions is most likely smaller. Therefore, we hypothesize the following:

H1. In the case of high as opposed to low product homogeneity, brand awareness affects market performance more positively.

3.1.2. Technological turbulence

When there are high levels of technological turbulence, uncertainty about technological innovation and hence the perceived risk for organizational buyers are high (Aldrich, 1979). Buyers may perceive a higher risk as associated with missing out on an innovation or focusing on the wrong innovation or product. At the same time, it might be more difficult to be up-to-date and have a deeper knowledge of all relevant innovations and products because great, rapid technological changes can be "competence destroying" for a buyer (Tushman & Nelson, 1990, p. 4). As a consequence, decision-makers may put more emphasis on reducing the risk associated with a buying decision. In such an environment, brand awareness is likely to be more important as a signal of quality, substance, and commitment than in the case of low turbulence and thus may more strongly reduce the perceived risk of organizational buyers.

Additionally, in the case of higher technological turbulence, the duration of the overall information search process is shorter (Weiss & Heide, 1993). Because acquired information in technologically turbulent markets is time-sensitive and has a short "shelf life," buyers have an incentive to act on it more quickly and curtail the search processes (Eisenhardt, 1989; Weiss & Heide, 1993). Consequently, buyers may not have the time to gather information about all existing product alternatives, which makes brand awareness a more critical factor for product purchase. As a result, we expect that in the case of high technological turbulence (where the buyer's uncertainty and risk are high), the overall effect of brand awareness on market performance will be stronger. Therefore, we hypothesize the following:

H2. In the case of high as opposed to low technological turbulence, brand awareness affects market performance more positively.

3.2. Moderating effects of characteristics of typical buyers

In this section, we continue to develop hypotheses regarding the effect of possible moderators on the link between brand awareness and market performance. In particular, we now focus on developing hypotheses regarding the moderating effects of characteristics of typical buyers: buying center size, buying center heterogeneity, and time pressure.

3.2.1. Buying center size

When buying center size is high, more resources are available for the decision-making process than in the case of low buying center size. More individuals are engaged in information searching and analysis. This may result in more extensive scanning and deeper

analyses of relevant information regarding different products (Hill, 1982). Furthermore, the influence of experts on the buying decision has been shown to be greater in large buying centers (Kohli, 1989). In such a situation, buyers may rely more heavily on the large amount of possibly more objective information gathered in extensive information searching as well as on expert opinions. Consequently, the importance of brand awareness for the purchase decision may be reduced.

Furthermore, the risk perceived by the members of the buying center is lower when more people are involved in the purchase decision. When a great deal of information is collected, analyzed and evaluated by the buying center, the uncertainty and thus the perceived risk of the buyers is reduced. In addition, studies from social psychology have shown that the risk perceived by an individual is lower when decisions are made in large groups (e.g., Myers & Lamm, 1976). As a consequence, the role of brand awareness as a quality signal may be less important, and the influence of brand awareness on the purchase decision may be reduced. Thus, we hypothesize the following:

H3. In the case of high as opposed to low buying center size, brand awareness affects market performance less positively.

3.2.2. Buying center heterogeneity

In the case of high buying center heterogeneity, individuals in the buying center have diverse functional backgrounds, work in different departments and on different hierarchical levels, and may have different roles within the purchasing process. Thus, the variety of skills and knowledge within the buying center may be high. Furthermore, because it includes many different individuals, the buying center may enjoy access to a higher level of diverse information on the products in the market (Shaw, 1976). As a consequence, the purchase decision can be based on the available information, allowing for a more objective evaluation. In contrast, the importance of brand awareness in decreasing information costs may be reduced.

Furthermore, different kinds of knowledge among buying center members increases the probability that a buying center will remember a brand with low awareness because it is more likely that at least one of the members will be familiar with this brand. This may reduce the impact of brand awareness on brand choice. Finally, high buying center heterogeneity is associated with a higher degree of formalization — i.e., buying activities are formally prescribed by rules, policies, and procedures (Johnston & Bonoma, 1981). This further decreases the importance of signals and extrinsic cues like brand awareness for the purchase decision.

Thus, we hypothesize the following:

H4. In the case of high as opposed to low buying center heterogeneity, brand awareness affects market performance less positively.

3.2.3. Time pressure

When the purchasing organization needs to reach a buying decision quickly, both uncertainty and the perceived risk for the organization are high (Johnston & Lewin, 1996). Time may be too short to search for sufficient information about the products involved. In such an environment, brands can increasingly function as a signal of product quality and reduce uncertainty.

However, under low time pressure, buyers more extensively search for information and use quantitative and structured techniques to analyze the purchase (Bunn, 1994; Gronhaug, 1975). Findings from social psychology also show that groups more carefully attend to the available information when time pressure is low (Karau & Kelly, 1992). Furthermore, under low time pressure, buying center members are likely to have more active interpersonal communication with each other, thus exchanging more information relevant for the purchase

decision (Dawes & Lee, 1996; Kohli, 1989). As a consequence, buyers will base their decision more strongly on the information gathered and on their purchase analyses rather than on extrinsic cues such as brand awareness.

Finally, another finding from social psychology shows that during group discussions, unshared information is mentioned relatively late, thus increasing the bias toward shared information when time pressure is high (Larson, Foster-Fishman, & Keys, 1994). Consequently, when buyers need to reach a decision quickly, the well-known brand is more likely to be in the center of the group discussion because of the group's shared information about it, which increases the likelihood of the brand's entering the consideration set. Therefore, we hypothesize the following:

H5. In the case of high as opposed to low time pressure, brand awareness affects market performance more positively.

4. Methodology

4.1. Data collection and sample

In our study, the unit of analysis is a strategic business unit (SBU) within a firm (or, if no specialization into different business units exists, the entire firm) and its most important brand. To obtain the necessary data for testing our framework, we relied on a large-scale survey of companies in B2B environments using key informants. Our initial sample consisted of 1850 firms (or business units when applicable) from a broad range of industries (machine building, electronics, chemicals, automotive supply, and others). These firms were contacted by telephone to identify the head of marketing, and a questionnaire was subsequently sent to these managers.

To ensure the reliability of our key informants, we included one item at the end of the questionnaire asking about the degree of involvement of the respondents with branding decisions at their firm. Returned questionnaires were discarded if this item was rated lower than five on a seven-point scale, with seven indicating high involvement. As a result, we had 310 useable questionnaires and a response rate of 16.8%. To our knowledge, this is the first cross-industry sample analyzing branding effectiveness in B2B environments. Table 1 shows the composition of our sample.

We tested for non-response bias in our data by comparing construct means for early and late respondents (Armstrong & Overton, 1977). No significant differences were found, indicating that non-response bias is not a problem. Additionally, to assess a possible non-response bias, we included response time as a control variable in our structural model. This did not alter our substantive findings in any way, which also indicates the absence of non-response bias.

4.2. Measures

We followed standard psychometric scale development procedures. Multi-item scales and single indicators were developed on the basis of a review of the extant literature and interviews with practitioners. We then pre-tested the questionnaire and further refined it on the basis of the comments from marketing managers and scholars during the pretest. A complete list of items appears in Appendix 1.

We measured *brand awareness* by asking managers to assess the average brand awareness in their marketplace with four items covering recognition, recall, top-of-mind, and brand knowledge (Aaker, 1996). These items closely match key metrics in brand tracking studies, which are regularly used in a large number of firms (Keller, 2007). We therefore expected that our key informants would be able to provide valid answers with regard to our brand awareness measures.

Table 1
Sample composition.

Industries	%
Machine-building	35
Electronics	16
Chemicals	20
Automotive	12
Other	17
Position of respondents	
Head of marketing	43
Head of sales	13
General management responsibility (head of strategic business unit, managing director, and chief executive officer)	24
Other	20
Annual revenue of the firm	
<$25 million	15
$25 million–$49 million	17
$50 million–$124 million	23
$125 million–$249 million	9
$250 million–$499 million	8
$500 million–$1250 million	6
>$2000 million	22
Number of employees at the firm	
<200	16
200–499	29
500–999	18
1000–4999	13
5000–10,000	5
>10,000	19

We measured *market performance* with four items asking managers to assess the SBU's average volume-related performance over the last three years in terms of customer loyalty, the acquisition of new customers, the achievement of the desired market share, and the achievement of the desired growth (Homburg & Pflesser, 2000; Reinartz, Krafft, & Hoyer, 2004; Workman, Homburg, & Jensen, 2003). Matching our definition, we measured *financial performance* with one item asking managers to assess the SBU's return on sales relative to that of its competitors over the last three years. For both of these constructs, we will describe a validation process, which used publicly available performance data, in the next section.

With regard to the moderator variables, we should note that we measured *product homogeneity* with three newly developed items assessing the degree of similarity of product characteristics in the market. *Technological turbulence* was measured with three items adapted from the work of Jaworski and Kohli (1993). To measure *buying center size*, we used a single item, asking respondents how many people were involved in the buying decision in typical customer firms. *Buying center heterogeneity* was measured with three items asking how members of typical customer buying centers differ (Stoddard & Fern, 2002). Finally, to measure *time pressure*, we used three items adapted from the work of Kohli (1989), asking respondents to assess whether decision-makers in typical customer firms need to make their purchase decisions quickly.

We included eight control variables in our model. *SBU size* was measured as the number of employees that work in the SBU. *Brand coverage* refers to the type of brand (company, family, or product brand). *Brand share of revenues* was measured with one item asking for the brand share of SBU revenues during the previous year. *Low price strategy* was measured using one item asking how strongly the brand stands out from the competition based on a focus on low prices. *Advertising expenses* was also measured using a single item, this time measuring the share of revenues spent on advertising. For *technical product quality*, we used a single-item measure that asked respondents to rate their SBU's technical product quality relative to that of its competitors' products. We measured *service quality* using three items related to the quality of the SBU's services, its distribution network,

and its logistic processes relative to those of its competitors. Lastly, as described in the previous section, we included response time as the control variable in our model to control for possible differences between early and late respondents. Response time was measured as the number of days between the day we sent out the questionnaire and the day we received it again.

Using confirmatory factor analysis, we assessed measure reliability and validity for each construct. Overall, our measures exhibit good psychometric properties. A comparison of squared correlations between constructs and their average variance extracted further indicates no problems with regard to discriminant validity (Fornell & Larcker, 1981).

4.3. Further measure validation using additional data

To validate the key informant responses regarding the three key variables in our framework – brand awareness, market performance, and financial performance – we collected additional data. In particular, for information on brand awareness, we scanned relevant trade journals, business magazines, and publicly available brand rankings (from market research companies, trade journals, etc.) from the industries included in our study to identify brand awareness data for the brands included in our sample. We were successful in doing so for 53 of the brands included in our sample. For these brands, we were able to identify either percentage information (with regard to recognition) or relative information on the brand's position in a brand awareness ranking. We coded this information into one seven-point scale (with anchors "recognition>86%" to "recognition<14%" and "position among the first 14% in the ranking" to "position among the last 14% in the ranking"). We then calculated the correlation between the newly gathered information on recognition and the managerial assessments of brand awareness. The corresponding correlation coefficient was positive – as expected – and highly significant ($r = .56$), thus providing further support for the validity of the key informant assessments.

To validate the key informant responses regarding market performance and financial performance, we collected performance data from independent sources. More specifically, we sought firms for which objective performance information is publicly available and identified 66 such firms in our sample (21%). Using financial databases and annual reports from the firms' websites, we obtained revenue and return on sales information for three consecutive years for the SBUs that participated in our study. We then calculated the average sales growth over the last three years, which corresponds to the time horizon of our market performance measure. This measure of sales growth is highly correlated with respondent assessments of market performance ($r = .47$, $p < .01$). In this context, we believe this correlation to be sufficiently high for two reasons. First, sales growth is only one indicator of the market performance construct. Second, we asked managers to assess market performance relative to that of their competitors, while objective performance information is non-comparative. We also ran a simple OLS regression to check whether results using objective sales growth data differ from our findings using the survey data. The results of this analysis are consistent with our main findings. In particular, the pattern of coefficients linking the interaction terms to the dependent variable is similar in the two models.

Based on the objective performance information available, we also calculated the average return on sales over the last three years and compared it with the financial performance construct in our framework. Again, it must be noted that objective performance information is non-comparative, while the managerial performance measure yields information about the position of the firm relative to its competitors. However, the correlation between objective and subjective performance assessments is highly significant ($r = .71$,

$p < .01$). In summary, these results support the notion that our respondents are reliable key informants for the topic studied.

4.4. Tests for common method bias

Because we relied on key informants in assessing all constructs in our framework, common method bias may be a threat to the validity of our findings (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In line with other recent studies in the marketing literature (Jayachandran, Sharma, Kaufman, & Raman, 2005; Ramani & Kumar, 2008), we therefore assessed the magnitude of this threat using multiple methods.

In this context, it is important to note that our study focuses on identifying moderating effects. Thus, our hypotheses imply that the strength of the link between brand awareness and market performance differs for different subgroups in our sample. At the same time, common method bias has been shown not to create artificial moderating effects (Evans, 1985). Consequently, in the following, we are mainly interested in finding out whether the links in our basic framework, comprised of the links from brand awareness to market performance and financial performance, are biased as a result of common method bias. Additionally, support for our hypotheses also indicates an absence of common method bias between brand awareness and market performance.

To test for common method bias, we first applied the Harman single-factor test. In this test, a single-factor model where all manifest variables are explained through one common method factor is compared via a chi-square difference test to the multi-factor measurement model actually used in the study. In our study, the single-factor model yielded a chi-square of 1897.7 (464 df). The fit of this model is significantly worse than the fit of the measurement model with all constructs in our framework ($\Delta \chi^2$ (111 df) = 1454.3, $p \leq .01$), indicating that the correlations between observed variables cannot be adequately explained by one common method factor.

Second, we used the Lindell and Whitney (2001) procedure, which is based on the idea that the degree of common method bias present in a dataset can be assessed by determining the correlation between a key dependent variable in the framework and a variable that theoretically should be uncorrelated with it (the marker variable). This correlation can then be used to correct the correlation matrix for common method bias. In the context of our study, we chose the correlation between technological turbulence and return on sales ($r = .01$) to correct the correlation matrix for common method bias. The statistical significance of the correlations does not change, which indicates the absence of common method bias (Van Doorn & Verhoef, 2008).

Lastly, we included a general common method factor in the structural model described in the next section. Similar to Parker (1999), we specified a general method factor. Every item from the constructs in our basic structural framework was allowed to load on this factor except for response time and brand coverage, where common method effects seem very unlikely. Thus, the common method factor reflects the variance common to all these indicators. To ensure model identification, we specified this general method factor to be uncorrelated with the other constructs in the framework. This corresponds to the assumption that the degree of common method bias is not associated with the magnitude of the constructs themselves. This assumption is typical for a large number of common method variance models (Podsakoff et al., 2003). We believe that this is quite realistic in the context of our research because it is unlikely that the managers at firms with high awareness brands will be more (or less) prone to common method biases. An inspection of the path coefficients in the resulting model revealed that the effects hold in this framework even if such a common method factor is included. This is a strong indication that

our findings are not merely due to the use of the same data source for all constructs.

5. Results

5.1. Basic framework

We used Mplus 4.2 to model the structural relationships put forward in our hypotheses. We first estimated a model with all variables from our framework and all control variables but without any interaction terms. Global fit measures of this model indicate very good model fit (χ^2/df = 1.21; RMSEA = .033; NNFI = .95; CFI = .96; SRMR = .048). Fig. 2 shows the results regarding the standardized path coefficients in this model.

The results show strong links for the main effects in our framework. More specifically, brand awareness is positively associated with market performance ($\gamma_{11} = .17$; $p < .05$). In turn, market performance is positively related to return on sales ($\beta_{31} = .45$; $p < .01$).

5.2. Moderated effects

To test our moderating hypotheses, we included latent interactions between the moderator and the respective independent variables in our model. We relied on the unconstrained model specification to specify the latent interaction using matched pairs to form the product indicators for the interaction terms (Marsh, Wen, & Hau, 2006). This approach has been shown to produce reliable results under a wide variety of conditions (Marsh, Wen, & Hau, 2004). Because this approach is relatively new to the marketing literature, we will describe it in more detail in relation to H1.

H1 predicts that in the case of high as opposed to low *product homogeneity*, the effect of brand awareness on market performance is stronger. Thus, H1 implies an interaction effect of latent variable brand awareness (ξ_1) and product importance (ξ_{10}) on market performance. As in regression approaches to testing interaction effects (e.g., Cohen, Cohen, West, & Aiken, 2003), H1 is considered to be supported if the

path coefficient $\beta_{1(1 \times 10)}$ linking a latent interaction term $\xi_1 \times \xi_{10}$ to market performance (η_1) is statistically significant.

To measure $\xi_1 \times \xi_{10}$, we rely on indicators that are products of the indicators of the latent variables involved in the interaction. Drawing on a large simulation study, Marsh et al. (2004, p. 296) posit two guidelines for use when forming these product indicators: (1) use all of the information and (2) do not reuse any of the information. They recommend forming product indicators by using every indicator of ξ_1 and every indicator of ξ_{10} just once, which leads to "matched pairs" (Marsh et al., 2004, p. 279).

However, because product homogeneity (like most other moderators in our framework) is measured through only three indicators (x_{15}, x_{16}, and x_{17}), whereas brand awareness is measured through four indicators (x_1, x_2, x_3, and x_4), no natural number of indicator pairs results in our case. Thus, we cannot strictly follow both guidelines referred to above. Because all four indicators of brand awareness reflect important facets of the construct (Aaker, 1996), we decided to put more emphasis on the advice regarding the use of all of the information. We therefore always used all indicators of brand awareness when forming the product indicators. More specifically, to measure $\xi_1 \times \xi_{10}$, we formed four product indicators: namely, $x_1 \times x_{15}, x_2 \times x_{16}, x_3 \times x_{17}$, and $x_4 \times x_{15}$. Following Algina and Moulder (2001) and in accordance with traditional regression approaches to analyzing interactions, we mean-centered all indicators before creating the product indicators to facilitate our interpretation of the results.

In the next step, we included $\xi_1 \times \xi_{10}$ as antecedent to market performance (η_1) in the structural equation model described in the previous section (i.e., including all moderator variables and all control variables). Formally, the introduction of a latent interaction into a structural equation model implies a number of additional constraints regarding the parameter estimates. However, an extensive simulation study by Marsh et al. (2004) shows that under a wide variety of conditions, not specifying these constraints will improve the results of model estimation. Therefore, we used the unconstrained estimation strategy advocated by Marsh et al. (2004) and estimated the resulting
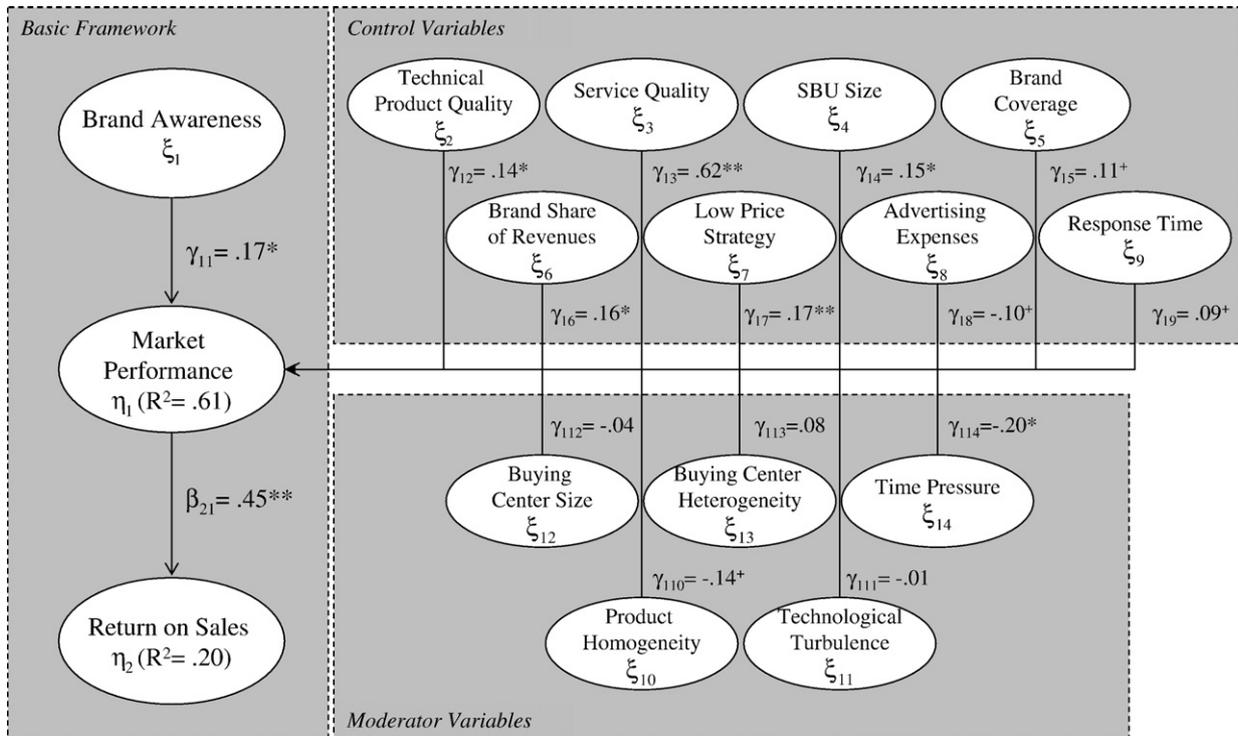
+: p < .10; *: p < .05; **: p < .01; Note: Completely standardized coefficients are shown.

Fig. 2. Results regarding main effects.

structural equation model using Mplus 4.2 without specifying parameter constraints.

With regard to the link between the interaction term and market performance, we find a significant effect ($\beta_{1(1 \times 10)} = .14$, $p < .05$). Thus, as predicted by H1, in markets characterized by high-product homogeneity, brand awareness and market performance are more strongly related.

We proceeded in a similar way to test the remaining suggested moderated effects included in our hypotheses. Table 2 summarizes the results regarding the moderating effects.

In particular, H2 is also supported by our data ($\beta_{1(1 \times 11)} = .18$, $p < .05$). Thus, we find that a firm's market performance is more strongly associated with brand awareness if technological turbulence in the industry is high.

With regard to characteristics of the firm's typical buyers, we do not find a moderating effect of buying center size on the link between brand awareness and market performance ($\beta_{1(1 \times 12)} = -.07$, $p > .10$). Thus, H3 is not supported by our data. At the same time, *buying center heterogeneity* moderates the relationship between brand awareness and market performance ($\beta_{1(1 \times 13)} = -.13$, $p < .05$). Brand awareness is less strongly associated with market performance if typical customers have heterogeneous buying centers. As a result, our data support H4. Lastly, we also find a moderating effect of the *time pressure* that the firm's typical customers face. More specifically, H5, which predicts a stronger association between brand awareness and market performance when time pressure is high, is supported by our data ($\beta_{1(1 \times 14)} = .12$, $p < .05$).

It is worth noting that in these models, the latent interaction terms were entered one at a time. Additionally, we tested the stability of our results in two ways. First, we estimated a structural equation model wherein all interaction terms were entered simultaneously. The results were similar to the results reported here. Second, we estimated an OLS regression model wherein all moderators and corresponding interaction terms were also entered simultaneously. The results of this additional analysis are highly consistent with the analyses reported here.

6. Discussion

6.1. Research issues

As noted, B2B marketing managers receive little guidance from marketing scholars on the question of whether investments in the creation of brand awareness pay off in business markets. First, findings regarding the effects of brand awareness in B2C markets cannot be easily applied to a B2B context due to the distinct risk and information

behavior of organizational buyers (Johnston & Lewin, 1996; Mitchell, 1995). Second, previous empirical B2B branding studies have focused on single industries (Yoon & Kijewski, 1995; Wuyts et al., 2009), but organizational buying behavior strongly depends on diverse situational characteristics (Lewin & Donthu, 2005). Against this backdrop, it is important to investigate *under which conditions* brand awareness is associated with firm performance in business markets.

Our study addresses this question by developing and empirically testing a contingency framework linking brand awareness to market performance. In particular, we analyze how market characteristics (product homogeneity, technological turbulence) and characteristics of a firm's typical organizational buyers (buying center size, buying center heterogeneity, time pressure in the buying process) moderate the relationship between brand awareness and market performance. We believe that the design of our study and the findings from the empirical analysis advance academic knowledge in several ways.

First, our study shows that under specific conditions, brand awareness is strongly related to performance in business markets. We find this effect while controlling for technical product quality, service quality, and several other constructs. Consequently, our study contributes to the growing body of literature on B2B branding by showing that the creation of brand awareness is indeed associated with performance in B2B environments. Importantly, in contrast to the findings presented in a number of earlier studies on the subject, our findings are based on a sample that is not restricted to a single industry. Therefore, we believe that our study is among the first to allow generalizable statements about B2B branding.

Second, we study the effect of situational characteristics on the link between brand awareness and market performance. In doing so, we follow calls from previous research to study moderators of the branding–performance link, particularly in relation to market characteristics (Cretu & Brodie, 2007; Hutton, 1997; Van Riel, de Mortanges, & Streukens, 2005) and characteristics of the buying situation (Davis et al., 2008). We find that product homogeneity, technological turbulence, buying center heterogeneity, and time pressure in the buying process all significantly moderate the association between brand awareness and market performance. Thus, we contribute to marketing research by identifying situations in which B2B brand awareness is related to performance.

It needs to be emphasized that our study assumes a supplier perspective in measuring buyer characteristics. We asked our respondents to provide assessments of the buying center and buying situation for *typical* customers. This approach ignores that every B2B firm will face some heterogeneity regarding the buying processes within its customer base. However, because market factors and environmental factors have an important influence on organizational

Table 2
Results regarding moderated effects.

Moderator	Hypothesis	Effects on market performance			
		BA[a]	MOD[b]	IAT[c]	Support
Product homogeneity	H1: In the case of high as opposed to low product homogeneity, brand awareness affects market performance more positively.	.17*	−.14[+]	.14*	✔
Technological turbulence	H2: In the case of high as opposed to low technological turbulence, brand awareness affects market performance more positively.	.18**	−.03	.18*	✔
Buyer center size	H3: In the case of high as opposed to low buying center size, brand awareness affects market performance less positively.	.17*	−.02	−.07	–
Buying center heterogeneity	H4: In the case of high as opposed to low buying center heterogeneity, brand awareness affects market performance less positively.	.13[+]	.00	−.13*	✔
Time pressure	H5: In the case of high as opposed to low time pressure, brand awareness affects market performance more positively.	.17*	−.21**	.12*	✔

[+]: $p < .1$; *: $p < .05$; **: $p < .01$.
Completely standardized coefficients are shown.
[a] BA = brand awareness.
[b] MOD = moderator.
[c] IAT = interaction term.

buying processes (Dwyer & Tanner, 2006; Johnston & Lewin, 1996), customers in specific markets will likely share specific traits. Thus, to some extent, B2B firms can be expected to have "typical" customers. Additionally, because branding decisions affect the entire customer base simultaneously, marketing managers in B2B firms will likely base their branding decisions on the perceptions of typical customers. Against this backdrop, we believe that our approach – measuring characteristics of typical customers – is appropriate.

Third, previous empirical research on the effects of B2B branding in general has produced mixed results. However, it has typically focused on only one industry. For that reason, the differing results may well stem from situational characteristics in the industries considered in these studies. The results of our moderator analysis may also be used to integrate these previous findings in the B2B branding literature. For example, our results indicate that brand awareness is more strongly associated with performance in markets with high levels of technological turbulence. This finding is consistent with those of earlier studies showing a positive effect of branding in markets that can be considered relatively turbulent, such as the semiconductor (Yoon & Kijewski, 1995), personal computer (Hutton, 1997), precision bearings (Mudambi, 2002), and logistics services (Davis et al., 2008) industries; it is also consistent with the findings of other studies indicating no effect in markets that can be considered to be more stable, such as the wood (Sinclair & Seward, 1988), fibers (Saunders & Watt, 1979) and shampoo markets (Cretu & Brodie, 2007).

While we investigated several moderators of the basic link that are important from an information economics perspective and that have been identified as key factors influencing organizational buying behavior, it may be interesting for future research to analyze further characteristics that may possibly influence the awareness–performance link. For instance, it may be interesting to investigate the role of the delivery process or that of buyer–seller relationships, which often play an important role in business markets.

At least two limitations of our study need to be mentioned. They also provide avenues for further research. First, it must be noted that our study focuses on only one key branding dimension: namely, brand awareness. We focused on this dimension because we believe that brand awareness plays a special role in driving brand equity in business markets where many firms limit their branding activities based merely on the dissemination of the brand name and the logo. It may be interesting for further research to investigate the effects of other branding dimensions. For instance, given the importance of long-term business relationships, relational constructs such as customer trust or company reputation may also play a major role in the business markets (Blombäck & Axelsson, 2007; Cretu & Brodie, 2007; Firth, 1993; Glynn et al., 2007; Lehmann & O'Shaughnessy, 1974).

Second, we rely on a cross-sectional survey design to collect data to test our hypotheses. This limits our ability to make strong causal claims based on our results. In particular, because our data analysis is basically correlational, we cannot eliminate the possibility that the association between brand awareness and performance is at least partially due to a causal effect of market performance on brand awareness. For instance, it appears possible that success in a marketplace leads to customer attention and thus also creates brand awareness. Consequently, based on our results, it cannot be claimed with certainty that brand awareness causally affects a firm's market performance. However, it is worth noting that it is far more difficult to apply this logic of reverse causality to most of our moderator hypotheses. For instance, there seems to be no intuitive explanation for why a possible effect of market performance on brand awareness should be more strongly pronounced in markets where buying centers are heterogeneous or where buyers face high levels of time pressure. Thus, our findings in this regard, taken together with the strong theoretical rationale behind the idea of there being a causal effect of brand awareness on market performance, raises our confidence that this link actually exists. Nevertheless, future research should directly address these causality issues by studying the link between brand awareness and market performance in B2B markets using longitudinal data.

6.2. Managerial implications

Many practitioners in B2B markets are still skeptical as to whether the high investments usually associated with building and establishing high brand awareness really pay off. Our study addresses this issue. It shows that even in B2B markets, brand awareness may provide an opportunity to differentiate products or services and gain an advantage over competitors.

To achieve high brand awareness, B2B companies must increase the familiarity of the brand. In B2C markets, repeated advertising (Miller & Berry, 1998), sponsoring (Cornwell, Roy, & Steinard, 2001), brand alliances (Simonin & Ruth, 1998), and public relations (Keller, 2007) have been identified as successful means of increasing brand awareness. In a study focusing on B2B markets, Bendixen et al. (2004) find that brand awareness is created through technical consultants and sales representatives, professional and technical conferences, and exhibitions as well as journals or professional magazines.

However, our study also shows that brand awareness is more strongly associated with market performance under some conditions than under others. Therefore, marketing managers must analyze and fully understand the complete dynamics of the buying center for their typical customers and their purchase background. These analyses are important because the association between brand awareness and firm performance is strongly reduced in markets with heterogeneous buying centers as well as markets where customers do not face time pressure regarding their purchases. Furthermore, managers should have a clear understanding of the technological turbulence in their market as well as their company's position with regard to the differentiation (versus commoditization) of its offerings. The effectiveness of brand awareness has been shown to be strongly reduced in markets that are technologically stable and offer heterogeneous products.

7. Conclusion

The importance of branding for increasing firm performance is firmly established for B2C firms. However, the differences between consumer decision-making and organizational buying prevent an application of findings regarding B2C branding to B2B contexts. Therefore, this paper was interested in the association between B2B branding and performance.

We focused on brand awareness because increasing brand awareness is a key element of many B2B branding strategies. In particular, the main objective of this paper was to understand when (i.e., under which conditions) brand awareness is associated with market performance. Based on a cross-firm, cross-industry survey sample with more than 300 B2B firms, we find that the association between brand awareness and market performance is stronger in markets with homogenous buying centers, greater buyer time pressure, homogenous products, and a high degree of technological turbulence.

Acknowledgements

Appendix 1. Measures and items

Measures	Item reliabilities
Brand awareness; newly developed based on Aaker (1996); seven-point scale: "strongly disagree" to "strongly agree"	
The decision-makers of our potential customers have heard of our brand.	.60
The decision-makers among our potential customers recall our brand name immediately when they think of our product category.	.82
Our brand is often at the top of the minds of the decision-makers in potential customer firms when they think of our product category.	.57
The decision-makers can clearly relate our brand to a certain product category.	.43
Market performance; based on Homburg and Pflesser (2000); seven-point scale: "clearly worse" to "clearly better"	
Over the last three years, how has your SBU performed relative to your competitors with respect to customer loyalty?	.34
Over the last three years, how has your SBU performed relative to your competitors with respect to the acquisition of new customers?	.45
Over the last three years, how has your SBU performed relative to your competitors with respect to achieving your desired market share?	.72
Over the last three years, how has your SBU performed relative to your competitors with respect to achieving your desired growth?	.54
Return on sales; seven-point scale: "clearly worse" to "clearly better"	
Over the last three years, how has your SBU performed relative to competitors with respect to return on sales?	n/a[a]
Product homogeneity; newly developed; seven-point scale: "strongly disagree" to "strongly agree"	
In our industry, it is difficult for us to differentiate ourselves from competitors based on technical product characteristics.	.31
With regard to functionality, our products are not very different from our competitor's products.	.66
Our products and our competitor's products have the same benefits for customers.	.62
Technological turbulence; adapted from Jaworski and Kohli (1993); seven-point scale: "strongly disagree" to "strongly agree"	
The technology in our industry is changing rapidly.	.46
Technological changes provide significant opportunities in our industry.	.68
A large number of new product ideas have been made possible through technological breakthroughs in our industry.	.35
Buying center size; newly developed; six-point scale: "1" to "10 or more"	
How many people in customer firms are typically involved in buying decisions regarding your products?	n/a[a]
Buying center heterogeneity; adapted from Stoddard and Fern (2002); seven-point scale: "strongly disagree" to "strongly agree"	
Buying center members in typical customer firms have differing professional backgrounds.	.53
Buying center members in typical customer firms have differing previous knowledge with respect to the purchase of our product.	.87
Buying center members in typical customer firms pursue different interests and priorities with the purchase of our products.	.42
Time pressure; adapted from Kohli (1989); seven-point scale: "strongly disagree" to "strongly agree"	
When customers buy products from this category, they typically feel pressured to reach a decision quickly.	.60
When customers buy products from this category, their decision-makers typically feel high time pressure.	.75
When customers buy products from this category, they rarely have much time to consider purchase-related information carefully.	.58
Technical product quality; newly developed, seven-point scale: "clearly worse" to "clearly better"	
Relative to that of your competitors, how do your rate your SBU's technical product quality?	n/a[a]
Service quality; newly developed, seven-point scale: "clearly worse" to "clearly better"	
Relative to that of your competitors, how do your rate the quality of your SBU's services?	.59
Relative to that of your competitors, how do your rate the quality of your SBU's distribution network?	.42
Relative to that of your competitors, how do your rate the quality of your SBU's logistic processes?	.44
SBU size; seven-point scale: "less than 200" to "more than 10,000"	
How many employees work in your business unit?	n/a[a]
Brand coverage; three-point scale: "company brand", "family brand", "product brand"	
Is the most important brand in your SBU a company brand, a family brand, or a product brand?	n/a[a]
Brand share of revenues; ten-point scale: "less than 10%" to "more than 90%"	
What was the brand share of SBU revenues of your most important brand last year?	n/a[a]
Low price strategy; newly developed, seven-point scale: "strongly disagree" to "strongly agree"	
Our brand stands out from the competition based on its focus on low prices.	n/a[a]
Advertising expenses; open-ended question	
What share of revenues does your SBU spend on advertising?	n/a[a]

[a] Construct measured through single indicator, item reliabilities cannot be computed.

Appendix 2. Correlations

	Mean	S.D.	Ave	CR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Brand awareness	2.52	1.03	.61	.86	1.00															
2. Market performance	2.94	.90	.59	.80	.38	1.00														
3. Return on sales	3.39	1.24	–	–	.11	.42	1.00													
4. Product homogeneity	3.35	1.31	.53	.77	−.07	−.15	−.17	1.00												
5. Technological turbulence	3.86	1.3	.50	.74	.01	.14	.01	−.01	1.00											
6. Buying center size	2.69	.96	–	–	−.07	−.05	.05	.27	−.16	1.00										
7. Buying center heterogeneity	2.68	1.27	.61	.82	−.18	−.02	−.03	−.01	.13	−.07	1.00									
8. Time pressure	4.93	1.32	.64	.84	−.14	−.08	.01	.26	.05	.17	.28	1.00								
9. Technical product quality	2.4	.89	–	–	.18	.39	.21	−.26	.06	−.09	−.01	−.03	1.00							
10. Service quality	3.11	.95	.49	.74	.27	.63	.39	.08	.15	.03	.02	.22	.35	1.00						
11. SBU size	3.41	2.09	–	–	.18	.21	.16	−.22	.19	−.15	−.08	−.26	.07	.02	1.00					
12. Brand coverage	1.53	.68	–	–	.21	.13	.10	.17	.00	.21	−.07	.06	.02	.23	.04	1.00				
13. Brand share of revenues	6.25	3.24	–	–	−.33	−.10	−.05	−.08	.00	−.05	−.02	.04	−.03	−.22	−.05	−.58	1.00			
14. Low price strategy	4.78	1.49	–	–	.02	.14	.02	.12	.12	.13	−.03	.26	−.17	.12	−.17	−.07	.06	1.00		
15. Advertising expenses	2.04	2.26	–	–	.09	.03	.09	.11	.01	−.01	−.13	.02	.09	−.05	−.07	−.08	.06	−.10	1.00	
16. Response time	13.33	9.81	–	–	−.07	−.03	−.02	.13	−.03	−.07	.11	.03	−.10	−.12	−.20	.00	−.03	.07	−.01	1.00

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